



Biologically Derived Conducting and Optically Active Polymers

Overview:

Biotechnological methods have been used to develop new materials with desirable electrical and optical responses for application to multifunctional soldier protection. Enzymatic polymerization has been used to synthesize a new class of soluble, conducting and optically active polyanilines and polyphenols. Until now, the practical use of these polymers has been limited due to both difficult synthetic techniques and limited processability. This new biological approach addresses and obviates these limitations and offers unsurpassed ease of synthesis, environmental compatibility and versatility.

Applications:

Multifunctional Materials for Soldier Protection include:

- Corrosion Protection
- Chemical and Biological Sensing
- Electrostatic Dissipation
- Electromagnetic Interference Shielding
- Light Weight Conducting Materials for Soldier System Integration
- Optical Devices
- Selectively Permeable Membranes

Accomplishments:

Enzymatic polymerization of aniline and phenol in the presence of a "matrix" polyelectrolyte has been developed. This breakthrough method is extremely versatile in that desired functionality and processability may be built into these materials through judicious choice of monomer or polyelectrolyte. Current studies include characterization of these new polymers and development of methodologies that can effectively process and integrate these polymers into lightweight, useful and durable coatings, composites, fibers and textiles for soldier protection. Numerous patents, publications and invited presentations on these technologies have resulted from this work.

Point of Contact:

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Solutions of New Water-Soluble Polyaniline Made at Various pH's.